

English Translation

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Notes:

1. Untranslatable words are replaced with asterisks (****).
2. Texts in the figures are not translated and shown as it is.

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CLAIMS

[Claim(s)]

[Claim 1] The nickel elution reduction processing method characterized by having the processing process which removes nickel plating which gave chromium plating after giving nickel plating at least to copper or the water supply instrument made from a copper alloy, and has been protruded from chromium plating after that.

[Claim 2] It is the nickel elution reduction processing method according to claim 1 that the processing process which removes said nickel plating is characterized by chromium plating making said copper which carried out nickel chrome plating, or the water supply instrument made from a copper alloy immersed into the solution in which it is not made to dissolve but nickel plating is dissolved.

[Claim 3] The nickel elution reduction processing method according to claim 1 characterized by immersing said copper or the water supply instrument made from a copper alloy in an acid etching solution with an oxidizing quality, and dissolving nickel.

[Claim 4] The nickel elution reduction processing method according to claim 1 characterized by immersing said copper or the water supply instrument made from a copper alloy in an acid etching solution with the oxidizing quality which added the inorganic system oxidizer or the organic system oxidizer, and dissolving nickel.

[Claim 5] The nickel elution reduction processing method according to claim 1 characterized by immersing said copper or the water supply instrument made from a copper alloy in an alkaline etching solution with an oxidizing quality, and dissolving nickel.

[Claim 6] Copper or the water supply instrument made from a copper alloy characterized by removing nickel plating which gave chromium plating after giving nickel plating at least to copper or the water supply instrument made from a copper alloy, and has been protruded from chromium plating after that.

[Claim 7] Copper or the water supply instrument made from a copper alloy characterized by

removing nickel plating which gave chromium plating after giving nickel plating at least to copper or the water supply instrument made from a copper alloy which has a water flow way inside, and has been protruded into the water flow way after that.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] The copper with which this invention gave chromium plating after nickel plating to copper or the water supply instrument made from a copper alloy, or the water supply instrument made from a copper alloy, It is related with copper or the water supply instrument made from a copper alloy which reduced elution of the nickel elution reduction processing method for reducing that nickel is eluted from protruded nickel plating, and nickel.

[0002] With a water supply instrument here Cock metal fittings, a water meter, a hot-water supply machine member, *****, It is a calorifier, a water cooler, a water purifier, a hot water boiler, an automatic vending machine, a ball tap, a low tank, a valve, a heat exchanger, a coupling, a header, a pipe, a sink stand, a washstand, a toilet bowl, a bathtub, the Housing Equipment Sub-Division unit, etc., and the instrument especially connected with the service pipe for drinks is said.

[0003]

[Description of the Prior Art] Conventionally, copper or copper alloy material is used widely, water supply instruments including cock metal fittings, a water meter, and a hot-water supply machine member are the purposes, such as a fine sight, corrosion resistance, and abrasion resistance, at these external surfaces, and chromium plating after nickel plating is given in many cases.

[0004] Although plating deposits outside to the Lord of a water supply instrument that these nickel plating and chromium plating are plated with a well-known electroplating method in many cases There is the characteristic around which the characteristic top nickel plating of electroplating liquid attaches and turns to the inside which hit a water flow way etc. from chromium plating as plating takes lessons also from an inside for a part and the surroundings are shown in ** of drawing 1 . In order to avoid that nickel plating sticks and turns to an inside, how to block a water flow way with a masking method can be considered, but the load on work -- form must mask a water supply instrument intricately in many cases certainly [many places] -- is serious.

[0005]

[Problem to be solved by the invention] A variety of water is used for the inside water flow way of these conventional water supply instrument, and the nickel which deposited on the water flow way by physicochemical factors, such as water quality factors, such as pH, water

temperature change, and a stream, may be eluted. Although as for nickel there is little toxicity compared with a lead, cadmium, etc. and the exudation standard from the water quality standard value or water tap of tap water does not exist at present, either, it is more desirable to be mentioned to the surveillance item of tap water, to also show the guideline value, and to avoid adhesion of nickel plating to a water flow part if possible:

[0006] Were made in order that this invention might solve the above-mentioned technical problem, and [the purpose of this invention] It is in offering the nickel elution reduction processing method of having reduced nickel elution and its copper, or the water supply instrument made from a copper alloy from the copper which gave chromium plating after nickel plating to the external surface of copper or the water supply instrument made from a copper alloy, or the water supply instrument made from a copper alloy.

[0007]

[Means for solving problem] In order to attain the above-mentioned purpose, this invention is characterized by having the processing process which removes nickel plating which gave chromium plating after giving nickel plating at least to copper or the water supply instrument made from a copper alloy, and has been protruded from chromium plating after that. In this invention, since it was made to have the processing process which removes nickel plating protruded from chromium plating, elution of nickel can be reduced from parts which carry out water-contacting, such as a water flow way.

[0008] As a desirable mode of this invention, the processing process which removes said nickel plating is characterized by chromium plating making the whole water supply instrument immersed into the solution in which it is not made to dissolve but nickel plating is dissolved. Since nickel is easily removable only by making solution immerse copper or the water supply instrument made from a copper alloy which gave nickel chrome plating according to this method, elution of nickel can be reduced without changing into the process to nickel-chrome plating.

[0009] The method in which said copper or the water supply instrument made from a copper alloy is immersed in an acid etching solution with an oxidizing quality as a desirable mode of this invention, and nickel is dissolved, Moreover, the method in which the method in which said copper or the water supply instrument made from a copper alloy is immersed in an acid etching solution with the oxidizing quality which added the inorganic system oxidizer or the organic system oxidizer, and nickel is dissolved and said copper, or the water supply instrument made from a copper alloy is immersed in an alkaline etching solution with an oxidizing quality, and nickel is dissolved is desirable.

[0010] Moreover, in this invention, copper or the water supply instrument made from a copper alloy from which nickel was removed is offered by giving said processing process.

Furthermore, it is suitable for removing nickel plating which gave chromium plating after giving

nickel plating at least to copper or the water supply instrument made from a copper alloy which has a water flow way inside, and has been protruded into the water flow way after that.

[0011] By this invention, without changing a present water supply instrument manufacturing process and a present nickel chrome plating process, the time and effort of masking a plated object is unnecessary, and this technical problem can be solved only by one processing process increasing after the completion of nickel chrome plating.

[0012]

[Mode for carrying out the invention] Although it is the purposes, such as a fine sight, corrosion resistance, and abrasion resistance, and chromium plating after nickel plating is first given to the external surface of copper or the water supply instrument made from a copper alloy in this invention, since it is carried out with a well-known electroplating method, generally the plating method is not limited in particular after a well-known plating pretreatment. As for nickel plating, 2 micrometers or more and 0.1 micrometers or more of chromium plating are usually given in many cases.

[0013] When chromium plating after nickel plating is given to a water supply instrument by a well-known method, thus, since nickel plating has the wide plating-on the characteristic deposit current density range of the plating first, Although plating takes lessons not only from the external surface but from an inside and the surroundings are based also on the form of a plated object, plating adheres several 10 to about 100mm from an inside entrance. To it, since chromium plating has the narrow plating-on the characteristic deposit current density range of the plating, plating to an inside sticks, and although there are very little surroundings and they are based also on the form of a plated object, plating adheres only several to about about tenmm from an inside entrance. Therefore, the portion to which only nickel plating has adhered may exist in the inside water flow way of a water supply instrument in many cases, and the nickel may dissolve into tap water.

[0014] So that nickel plating sticks and may not turn to an inside in order that this invention persons may get the method of reducing nickel elution, and its water supply instrument, as a result of inquiring wholeheartedly Time and effort of masking a plated object so that plating liquid may not go into an inside at the time of form change of a water supply instrument, change of nickel plating conditions, and plating is not needed. The method of removing only nickel plating of an inside was found out after the completion of nickel chrome plating of a water supply instrument by the conventional method, and this invention was completed.

[0015] It was not made to corrode or dissolve but the portion which is double layer plating of nickel plating and chromium plating as a method of carrying out dissolution removal only of the nickel plating of an inside in the water supply instrument which nickel chrome plating completed found out the medicine and the immersion conditions which carry out dissolution removal only of the nickel plating of an inside.

[0016] Medicine with an oxidizing quality can be used as a kind of acid medicine which carries out dissolution removal only of the nickel plating, and nitric acid independent solution, hydrogen peroxide-sulfuric acid content liquid, hydrogen peroxide-acidity fluoride content liquid, hydrogen peroxide-nitric acid content liquid, and those mixtures can be used. In these solution, several g/L - about 10g/L of numbers may add organic system oxidizers, such as inorganic system oxidizers, such as hypochlorous acid salt, a bleach, fault sulfate, and perchloric acid salt, and meta-nitroglycerine benzenesulfonic acid salt, PARANITORO benzoic acid salt, timely. Although immersion conditions change also with the kinds and concentration of medicine to be used, about 10 minutes of temperature are [about 50 degrees C and immersion time] desirable from several 10 seconds from normal temperature. Although gentle placement is sufficient as an article at the time of immersion, make it more desirable to rock lightly. By immersing a water supply instrument on these conditions, the chromium plating part can carry out neither the dissolution nor corrosion at all, and can carry out dissolution removal only of the nickel plating.

[0017] moreover, also as a kind of alkaline medicine which carries out dissolution removal only of the nickel plating medicine with an oxidizing quality can be used and independent in sodium hydroxide, water oxidization potassium, sodium carbonate, sodium bicarbonate, sodium phosphate, a meta-sodium silicate, ORUSOKEI acid sodium, etc. -- or [mix and] The solution as for which several g/L - about 10g/L of numbers added organic system oxidizers, such as inorganic system oxidizers, such as hypochlorous acid salt, a bleach, fault sulfate, and perchloric acid salt, and meta-nitroglycerine benzenesulfonic acid salt, PARANITORO benzoic acid salt, can be used for the concentration of several g/L - the solution of about 10g/L of numbers. Although immersion conditions change also with the kinds and concentration of medicine to be used, about 30 minutes of temperature are [50 degrees C to about 80 degrees C, and immersion time] desirable from 3 minutes. Although gentle placement is sufficient as an article at the time of immersion, make it more desirable to rock lightly. By immersing a water supply instrument on these conditions, the chromium plating part can carry out neither the dissolution nor corrosion at all, and can carry out dissolution removal only of the nickel plating. As a commercial item, product CHP-made from Ebara YUJI light200X etc. can use product OS-made from Ebara YUJI light 456, ST-410, metal chemically-modified technical research center NIFURAKKU FS, etc. as a nickel parting agent as copper and chemical-polishing liquid for copper alloys. Moreover, except dissolution removal of nickel by medicine, the nickel removal by physical power, such as polish processing and machining, does not interfere at all, either.

[0018]

[Working example] Although an example explains this invention below concretely, as for this invention, it is needless to say that it is not limited by this and many can be changed within the

limits of the technical idea of this invention.

[0019] In order to evaluate the appearance of outside nickel chrome plating, the adhesion nature of outside nickel chrome plating, the removal nature of inside nickel plating, and the amount of nickel elution from an inside The main part of cock metal fittings of the bronze casting (BC6) was used as a test sample, and nickel chrome plating was first performed to cock metal fittings on the conditions indicated below. The pretreatment of plating was washed ~~for 30 seconds after 60 degrees C and 5-minute immersion in ORUSOKEI acid sodium 50 g/L liquid, and was unified into the liquid of chloride on condition of the flush for 30 seconds after normal temperature and 1-minute immersion 2%.~~ Nickel plating is watt ** ([300g/L of nickel sulfate 6 hydration things]). 40g/L of chlorination nickel 6 hydration things, 40g/L of boric acid, 1 next system brightening agent of marketing to pH 4.5 (stress reduction agent), The second order system brightening agent (leveler ingredient) and the pit prevention agent (surface-active agent) were added, and it plated, carrying out air churning in current density 5 A/dm², plating temperature [of 60 degrees C], and plating time 10 minutes. After the flush, chromium plating is current density 20 A/dm², plating temperature [of 55 degrees C], and plating time 3 minutes, and was plated with the Sargent ** (250g/L of chromic anhydride, 2.5g/L of sulfuric acid, and trivalent chromium 3g/L) without air churning. Various kinds of evaluations were performed as compared with the example which made the comparative example the done nickel chrome plating article, and carried out the following.

[0020] The completion article of nickel chrome plating created on example 1 comparative example and these conditions was enough washed after immersion for 5 minutes the temperature of 40 degrees C, and with rocking to the 200g/L sulfuric acid-20g/L hydrogen peroxide mixed solution.

[0021] The completion article of nickel chrome plating created on example 2 comparative example and these conditions was enough washed after immersion for 3 minutes the temperature of 50 degrees C, and with rocking to the 200g/L sulfuric acid-30g/L hydrogen peroxide mixed solution. The plating sectional view of each cock metal-fittings external surface after the nickel plating removal process of an inside and an inside is shown in drawing 1 after a nickel plating process and a chromium plating process.

[0022] The nickel chrome plating appearance of a comparative example and viewing compared the appearance valuation method of outside nickel chrome plating, and when there were no abnormalities, such as a gloss fall, corrosion, and the dissolution, and there were success and abnormalities, it was made into the failure.

[0023] The adhesion nature valuation method of outside nickel chrome plating was made into the failure, when success a few also had exfoliation because the edge of a cutter is strongly rubbed at the angle of about 5 degrees to a nickel chrome plating side and there is [the float of nickel chrome plating visually, the swelling thing which nothing is, and] no exfoliation of

plating.

[0024] The removal nature valuation method of inside nickel plating cut cock metal fittings in the half, and checked nickel removal nature visually.

[0025] The valuation method of the amount of nickel elution from an inside follows JIS S 3200-7 (1997) "water service instrument implement-transudatory ability test method". The ion exchange water adjusted to pH 7 alkalinity of 35 ppm, the hardness of 45 ppm, and 0.3 ppm of residual chlorine was put in in the test sample, and it kept at 23 degrees C, and it was neglected for 19 days on the way, carrying out the number-of-times liquid substitute of regulation, and the nickel concentration of the water was measured with flameless-atomic-absorption-spectrometry equipment.

[0026] The test result was summarized in Table 1.

[Table 1]

試験No	外面ニッケル クロムめっき の外観	外面ニッケル クロムめっき の密着性	内面ニッケルめっき の除去性	内面からのニ ッケルの溶出 量 (mg/L)
実施例 1	合格	合格	90%程度ニッケル が除去されている。	0.0002
実施例 2	合格	合格	ほぼ100%ニッケ ルが除去されている 。(図2参照)	0.0001
比較例	合格	合格	内面入り口から1cm 程度ニッケルがつき まわっている。 (図3参照)	0.0015

[0027] In the passage clear from Table 1, an example 1 and 2 have checked that nickel of an inside was removed and outside nickel chrome plating appearance and adhesion nature could also reduce the amount of nickel elution greatly satisfactorily compared with a comparative example.

[0028]

[Effect of the Invention] This invention demonstrates the following effect by the above-mentioned composition. Without changing a nickel chrome plating process, the time and effort of masking a plated object is unnecessary, and [that one processing process only increases after the completion of nickel chrome plating] The processing method and copper, or the water supply instrument made from a copper alloy which can reduce elution of nickel from copper or the water supply instrument made from a copper alloy can be offered

[Translation done.]